

REMARKS/ARGUMENTS

Favorable reconsideration of this application is respectfully requested.

Claims 25-32 are pending for examination in this application. Claims 25, 27, 29, and 31 have been amended to better clarify the extraction of current through the current sense emitter and the press contacting arrangement of the present invention, without the introduction of any new matter.

The outstanding Office Action presents a rejection of Claims 25-32 under 35 U.S.C. § 103(a) as being unpatentable over Yanagisawa et al (U.S. Patent No. 5,874,750, Yanagisawa), in view of Takeda et al (1998 International Symposium article, Takeda).

Before considering the outstanding prior art rejection applied to Claims 23-32, it is believed that a brief summary of the invention would be helpful. In this regard, the present invention involves a chip-like voltage-driven power semiconductor device that has features including:

- (1) The power semiconductor device comprises a chip-like injection enhanced gate transistor (IEGT).
- (2) The IEGT has a current sense emitter in addition to a main emitter from which current is extracted to an external protection.
- (3) The IEGT has a current path representing a carrier concentration having a maximum value at the MOS gate side of the high-resistance (N-) base layer (for example, see FIGS. 46 and 47 and the corresponding description of page 72, line 21 to page 74, line 6).
- (4) The IEGT is mounted between plate-like collector and emitter electrodes in a manner to form a press-contacting type package.

The importance of feature (3) was fully discussed in the last response. With regard to feature (2), each of the independent claims has been amended to emphasize this current

extraction from a current sense emitter. There is clearly no new search or examination burden and the amendment should be entered.

Turning to the rejection of Claims 25-32 under 35 U.S.C. § 103(a) as being unpatentable over Yanagisawa in view of Takeda, it is clear that Yanagisawa at best teaches an IGBT having an emitter electrode plate 16 and a collector electrode plate to form a pressure-contact type IGBT which comprises a single-emitter structure and an emitter sensing terminal ES directly connected with the single emitter for monitoring the emitter voltage (which is a potential difference between the emitter on the IGBT chip and the ground of the gate circuit), so that the emitter sensing terminal is not influenced by inductance between the signal emitter and the emitter sensing terminal. In operation, a voltage (a potential difference) of the emitter on the IGBT chip and the ground of the gate is taken out at the emitter sensing terminal and no substantial current flows through the emitter sensing terminal. Clearly, the emitter sensing terminal is used to make the ground potential of the gate control circuit correspond to the ground potential of a chip.

On the contrary, according to the embodiment shown in FIG. 24, for example, the IEGT 42a has a double-emitter structure including a main emitter connected to the inductance 53a and a sense-side emitter connected to the gate of the protection transistor Tr. In operation, a part of the emitter current flows through the current sensing resistor Rs and a voltage generated at the current sensing resistor Rs is supplied to the gate of the protection transistor Tr to prevent excessive current flowing in the main emitter.

Clearly, no such double-emitter structure having the sense-side emitter for sensing the emitter current in the IEGT is described or suggested by Yanagisawa.

Takeda shows no more than a trench gate type IEGT having a multi-emitter structure for an over current limiting circuit. No pressure contact structure is described unlike the present invention. Thus, the IEGT shown by Takeda is not of a pressure contact type.

Therefore, it is clear that Yanagisawa shows no more than a pressure-contact type IEGT having an emitter voltage sensing terminal connected to a single emitter and does not show an emitter current sensing terminal connected to one of a double-emitter structure. Takeda shows no more than an IEGT having a double-emitter structure and does not show a pressure-contact type IEGT having a current sense emitter.

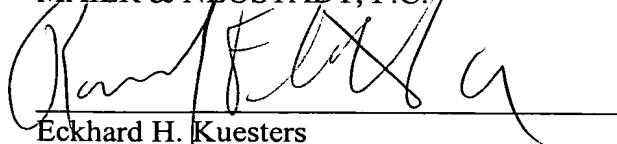
Thus, even if the structure taught by Yanagisawa were to be modified by or combined with that shown by Takeda, the pressure-contact type IEGT having a current sense emitter recited in the amended independent claims is not the result and no *prima facie* case of obviousness has been established and this rejection is traversed. This rejection is also traversed for the reasons fully set forth in the previous response.

It is again noted that the drawings filed on December 19, 2002 have not been properly acknowledged. Please note that in the last response copies of the drawings filed along with a copy of the date-stamped filing receipt indicating the filing thereof were enclosed and a request was made for acknowledgement of this filing was made. This acknowledgement is again requested.

As it is believed that no other issues remain outstanding in this application, it is further believed that this application is, accordingly, in condition for formal allowance and an early and favorable action to that effect is, therefore, respectfully requested.

Respectfully submitted,

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